Pipeline & Utilities Construction

JANUARY 1992

Pipeline Construction Review/Forecast

- U.S., Canadian, and International Construction Outlook
- PLCA Convention Preview

Pipeline & Utilities Construction

January 1992 Volume 47 Number 1A

On the cover: Tape-wrap machine applies protective cover during reconditioning of an in-service gas line in Wyoming.

Page 27: A John Henry rock drill sets blast holes on a rocky stretch of the Iroquois natural gas line upstate New York.

Page 30: A swivel-mounted barrel reamer prepares to pull back natural gas pipe on a crossing of a four-lane highway near Houston's Intercontinental Airport.

FEATURES

Murphy Bros. "Experiments" With Excavators 22

Crawler Tractor Equipment Focus 25

Tennessee Ties in Niagara Loop 27

A&L Constructs Uptown Pipeline 30

PLCA Convention Preview 34

Pipeline Construction Review 40

Pipeline Construction Forecast 41

DEPARTMENTS

Construction News 7

Canadian Report 13

International News 14

Mile Markers 18

Industry Update 20

Contracts Let/Utility Report 52

Special Classified 57

Ups and Downs Balance Pipeline Picture for 1991

Pipeline construction in 1991 rose from the previous year's total as upheavals in world events dramatically influenced the petroleum and natural gas industries.

Although worldwide figures proved to be much lower than projected, mostly due to the Persian Gulf War, U.S. mileage rose from last year's total of 4,000 miles to 6,591 miles thanks to the completion of several major projects including Kern River, Mojave, and Iroquois. Canadian mileage stayed almost even, with this year's total of 1,699 miles comparing to 1,739 last year. International figures showed a substantial loss, with 2,440 miles of pipeline this year as opposed to 3,971 last year.

In the United States, 4,333 miles of natural gas line was constructed, as compared to last year's total of 2,468. Products lines rose from 383 to 839 miles, yet crude oil slipped from 258 miles to 215 miles. More miles of pipeline were rehabilitated or repaired on the domestic front, with 1,204 miles in 1991 compared to 891 in 1990.

Canada showed 1,659 miles of new natural gas lines built, almost even with last year's total of 1,697. Product lines, nonexistent in 1990, were up with 15 miles constructed. Crude oil lines slipped from 42 to 25 miles.

Worldwide, natural gas pipeline construction totaled 1,894 miles, down from 1990's total of 2,452 miles. Product lines dropped also, from 374 down to 183 miles. Crude oil lines were severely down, again as a result of the Middle East conflict. Only 363 miles of crude lines were built, as opposed to 1,145 last year. The majority of the construction came from Europe and the Pacific Rim.

Pipeline Construction for 1991

	Natural Gas	Products	Crude Oil	Replacement/Repair	TOTAL
U.S.	4,333	839	215	1,204	6,591
CANADA	1,659	15	25	--	1,699
INTERNATIONAL	1,894	183	363	--	2,440
WORLD TOTAL	7,886	1,037	603	1,204	10,730

Worldwide Pipeline Construction to Increase in 1992

U.S. and Canadian mileage to have moderate decline

By Oliver Klinger Jr.

The pipeline industry should have a year of continued growth worldwide in 1992 with continued substantial activity in gas pipelines, but with fewer major projects under construction. Water and sewer pipelines will be aided by projected additional federal funding as part of the Bush administration's program to accelerate construction work in general.

At present, the worldwide total for new pipelines planned is 36,436 miles to cost $14,940,001,000. This compares with 25,384 miles and $13,561,040,000 forecast for 1991 a year ago.

In the United States, the planned new mileage of 19,321 miles is well above the 9,534 planned a year ago for 1991, even with the completion in 1991 of a number of major gas line projects. The 1992 cost estimate is $5,887,353,000, an increase over the $5,096,023,000 for 1991.

The forecast for international pipelines is considerably higher at 15,418 miles and $7,413,430,000 against 12,841 miles and $5,087,470,000 for 1991.

Pipeline work in Canada will be down considerably at 1,087 miles and $1,556,500 for 1992, well below the 3,009 miles and $377,547,000 for 1991. We believe this estimate for 1992 is a bit on the low side and actual work could be higher.

The major U.S. gas pipeline project will be Pacific Gas Transmission Co.'s 742-mile, 42-inch line from the Canadian border to the San Francisco area. If Canadian authorities approve, the 620-mile, 30-inch Altamont gas line from Canada which will hook up with the Kern River system at Opal, Wyo., could also get under way.

Florida Gas Transmission Co. has a huge 800-mile project to supply additional gas to Florida users, but this may not get underway until 1993. One of the two big 800-mile gas lines proposed in Alaska should go, but probably not until 1993.

Northwest Pipeline Co. plans 468 miles of 24-inch gas line to cost $372,000,000, while Colorado Interstate Gas Co. has 223 miles of 20-inch to cost $85,000,000. Natural Gas Pipeline Co.'s plans include 115 miles of new line to cost $130,000,000.

CNG Transmission will lay 80 miles and add 45,000 compression horsepower to cost $206 million. Trans Colorado Gas Co.'s proposed system will have 310 miles of 20-inch line to cost $210,000,000, and Transwestern Pipe Line will have 92 miles of 30-inch to cost $95 million.

International Work to Boom

Canada should have a fair volume of work with additional gas line capacity needed to supply the U.S. West and East Coast markets. Conversion of the Sarnia-Montreal oil line to gas service seems likely also. Trans Mountain Pipe Lines has plans for some new oil pipeline also. Trans Canada Pipe Lines plans 648 miles of big-inch lines to cost $1,492,000,000.

The largest area of pipeline construction in 1992 will be in the international area. Many hundreds of miles of new lines are needed in Eastern Europe and there will be a substantial volume of work in Iran, the Middle East, Africa, and Latin and South America. Many major projects are maturing in South America.

The big Europipe system to supply Norwegian gas to European markets will be constructed. In Greece, a 510 km gas line will be built from the Bulgarian border to Athens. The Transmediterranean gas line from Algeria to Sicily and across the Messina Straits to Italy will be constructed and a number of new lines are planned in Italy.

The very substantial increase in European gas demand has resulted in a reported 8,000 km of new pipeline construction in 1991, with some 15,000 km of planned pipelines under consideration in 1992 and future years.

UNITED STATES		
Gas Transmission	4,098	$ 3,783,725,000
Gas Mains/Distribution	14,395	1,800,000,000
Products	336	12,838,000
Crude	492	290,790,000
Total (New Construction)	19,321	5,887,353,000
Repair/Rehab/Replacement	610	82,718,000
Grand Total	19,931	$ 5,970,071,000
CANADA		
Gas Transmission	817	$ 1,550,200,000
Gas Distribution	260	6,300,000
Grand Total	1,087	$ 1,556,500,000
INTERNATIONAL		
Gas Transmission/Distribution	6,794	$ 3,832,797,000
Products	5,296	1,378,003,000
Crude	3,009	1,883,600,000
Total (New Construction)	15,009	7,094,400,000
Repair/Rehab/Replacement	319	319,030,000
Grand Total	15,418	7,413,430,000
TOTAL WORLDWIDE	36,436	$ 14,940,001,000

DOMESTIC CRUDE

Ashland Pipe Line Co.
Replacement
27 miles: 6-, 8-, and 16-inch
Cost: $ 14,844,000
Wyandot, Crawford, and other counties in Ohio

Citgo Petroleum Corp.
Repair/rehab
Cost: $ 800,000
Various locations

Diamond Shamrock Oil Co.
Transmission
270 miles: 14-inch
Cost: $ 40,000,000
Wichita Falls to Dumas, Texas

Marathon Pipe Line Co.
Transmission/gathering
3 miles: Various inches
Cost: $ 790,000
Gulf of Mexico South Pass Block
Repair/rehab
Cost: $ 212,000
Yates Field, Texas

Mobil Oil Corp.
West Coast Pipe Lines
Replacement
65 miles: 16-inch O.D.
Cost: $ 52,000,000
Los Angeles County, Calif.

Trans Mountain Oil Pipeline Co.
Transmission
219 miles: 24- and 36-inch
Cost: $ 250,000,000
Low Point to Anacortes, Wash.
Burlington to Low Point, Wash.

FOREIGN CRUDE

Fina Petroleos de Angola
Angola
Transmission
12 miles: 6- and 8-inch
Cost: $ 600,000
Sereia to Quinfuquena
Ganda Kitona to Pangala
Replacement
6 miles: 4-inch
Cost: $ 200,000
Cabeca da Corba

Sonatrach
Algeria
239 miles: 34 inches
Cost: $200,000,000
Hboud el Hamra to Skikda

Petrobas
Brazil
22 miles: oil line
Cost: $260,000,000
Sao Paulo to Santos

China National Oil Corp.
China
180 miles: 20 inches
Cost: $80,000,000
Zhongyuan field to Luoyang
Henan refinery

Cuban government
Cuba
116 miles: 20 inches
Matanzas terminal to refinery at Cienfuegos

Chemopetrol
Czechoslovakia
Transmission
217 miles: Various inches
Cost: $ 200,000,000
Ingolstadt, Germany, to Kralupy Vaitor, Bohemia

Conoco Ecuador, Ltd.
Ecuador
Dual 100 mile lines
Cost: $200,000,000
Oriente region

Kenya Pipeline Co., Ltd.
Kenya
225 miles: 8 inches
Cost: $100,000,000
Extend Mombasa-Nairobi line to Uganda border

Korea Ministry of Energy and Resources
Korea
540 miles: large diameter
Cost: $450,000,000
Western Pipeline: Yeosu to Seoul
Eastern Pipeline: Onsan to Seoul

Societe Cherifienne des Patroles
Morocco
115 miles: 14 inches
Cost: $8,000,000
Port of Mohammedia to Sidi Kacem refinery

Chevron Corp.
New Guinea
163 miles
Cost: $125,000,000
Kutubu to terminal at Gulf of Papua

National Nigerian Petroleum Corp.
Nigeria
308 miles: 12, 16 inches
Cost: $250,000,000
Port Harcourt to River Niger

Shell Petroleum Development Co.
Nigeria
7 miles: 8 inches
43 miles: 20-24 inches: Opukushi to Forcados
6 miles: 8 inches: flow station to Ogara
6 miles: 8 inches: to Kanbo manifold
Cost: $5,000,000

Chinese Petroleum Corp.
Taiwan
40 miles: 12-20 inches crude and products line to oil terminal
Cost: $5,000,000

Botas
Turkey
570 miles: large diameter
Looping of oil line from Iraq to Turkey

DOMESTIC PRODUCTS

Chevron Pipe Line Co.
Repair/rehab
275 miles: Various inches
Various locations in Texas

Fremont Dept. of Utilities
Rehab
7 miles: 2-inch
Cost: $ 375,000
Fremont, Neb.: distribution mains

Mid-America Pipeline Co.
Gathering
5 miles: 4-inch
11,300 HP
Cost: $ 5,838,000
Big Spring, Texas

Quest Enterprises Inc.
Transmission
23 miles: 16-inch
Mont Belvieu, Texas

Santa Fe Pacific Pipelines
Distribution
33 miles: 12-inch
3,400 HP
Cost: $ 7,000,000
Arizona

FOREIGN PRODUCTS

Ecopetrol
Colombia
119 miles: 6, 12 inches
Cost: $30,000,000
Three lines: Medellin to Rionegro; Facatativato Villavicencio; Sebastopol to Medellin

Ste. du Pipeline Mediteranee-Rhone
France
94 miles: 12 inches

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La Mede to Puget sur Argens

TRAPIL
France
Transmission
22 miles; 16-inch
5,400 HP
Cost: $ 17,000,000
Gargenville to Coigneres, France

Shell Multi-Partner Venture
Germany
Transmission
270 miles; 20-inch
Cost: $ 400,000,000
Hamburg to Dresden, Germany

Petromin
Indonesia
650 miles; 10 inches
Cost: $75,000,000
Trans Java network

National Iranian Oil Co.
Iran
1,140 miles; 12 inches
Cost: $90,000,000
Arak to Malayer and Mamadan

Tamoil Italia SpA
Italy
Repair/rehab
63 miles; 12 inch
Cost: $ 250,000
Cremona, Italy

Kenya Pipelines Co. Ltd.
Kenya
355 miles; 6-8 inches
Cost: $40,000,000
Nairobi to Kisumu-Eldoret

Korea Petroleum Development Corp.
Korea
541 miles products line network
Cost: $25,000,000
Yosu and Onsan to Seoul

Petronas-Petroleum Nasional Berhad
Malaysia
Transmission
129 miles; 8- to 18-inch
45,800 HP
Cost: $ 240,000,000
Bayan, Seligi, and Guntong, Malaysia

Nigerian National Oil Corp.
Nigeria
Distribution
33 miles; 16 inches
Bonny terminal to Port Harcourt
309 miles; 12; 16 inches
Port Harcourt, Enugu, Auchi, to Benin City
Cost: $140,000,000

Petroleos Del Peru
Peru
52 miles; 4-6 inches
Aguaytia to Pucalpa Campo
30 miles; 3 inches
Aguaytia to Campo Verde
Cost: $3,000,000

Campsa
Spain
13 miles; 8 inches
Almodovar to Merida
60 miles; 10 inches
Alicante to Cartagena
90 miles; 10 inches
La Coruna to Vigo
Cost: $20,000,000

General Petroleum Corp.
Sudan
Transmission
500 miles; 8 inch
1,800 HP
Cost: $ 1,003,000
Port Sudan to Khartoum
Replacement
3 miles; 8-inch
Cost: $ 330,000
Area near Port Sudan

Corpoven SA
Venezuela
373 miles; medium diameter
Cost: $100,000,000
Puerto la Cruz regnery to Maturin, San Tome, Ciudad Bolivar, Puerto Ordaz, Puerto Ayacucho

Maraven SA
Venezuela
258 miles; 12 inches
Cost: $75,000,000
San Lorenzo, Lake Maracaibo to El Vigia and Tachira

Lonrho PLC
Zimbabwe
135 miles; 10 inches
Cost: $30,000,000
Feruka to Harare

Petrozim Ltd.
Zimbabwe
Transmission
123 miles; various inches
Cost: $ 67,000,000
Feruka to Harare, Zimbabwe

DOMESTIC NATURAL GAS

ANR Pipeline Co.
Transmission
41 miles; 8- to 36-inches
Cost: $ 36,800,000
Michigan and Wisconsin
Replacement
2 miles; 22- and 30-inches
Cost: $ 3,500,000
8,550 HP
Cost: $ 9,000,000
Various locations in Iowa and Indiana

Altamont Gas Transmission Ltd.
Transmission
620 miles; 30-inch
Wild Horse, Mont., to Opal, Wyo.

Arkla Inc.
Replacement
29 miles; 16-inch
Cost: $ 9,002,000
Line 2 in Oklahoma

CNG Transmission Corp.
Transmission
80 miles; 24- and 30-inches
45,050 HP
Cost: $ 206,000,000
Several counties in Ohio and Pennsylvania

Colorado Interstate Gas Co.
Transmission
223 miles; 20-inch
Cost: $ 85,000,000
Wyoming, Colorado, and Utah

Columbia Gulf Transmission Co.
Repair/rehab
1 mile; 30- and 36-inches
Cost: $ 887,000
Evangeline Parish, La., and Mississippi

Florida Gas Transmission Co.
Transmission
540 miles; 36-inch
Cost: $ 750,000,000
Texas, Louisiana, Mississippi, Alabama, and Florida

Gateway Pipeline Co.
Transmission
25 miles; 30-inch
Cost: $ 21,700,000
Mobile Bay area

Gatz Terminals Corp.
Transmission
120 miles; 10-inch
Cost: $ 20,000,000
Tampa to Ft. Myers, Fla.

Natural Gas Pipeline Co. of America
Transmission
115 miles; 30-inch
8,000 HP

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Cost: $ 130,000,000
Near Harper, Iowa

Northern Border Pipe Line Co.
Transmission
80,000 HP
Cost: $ 200,000,000

Northwest Pipeline Co.
Transmission
468 miles; 24-inch
150,000 HP
Cost: $ 372,000,000
21 spreads in various locations

Ozark Gas Transmission System
Transmission
10,000 HP
Cost: $ 17,000,000

Pacific Gas Transmission Co.
Transmission
800 miles; 42-inch
Cost: $ 760,000,000
Add 105,000 HP
Cost: $ 142,500,000
Kingsgate, British Columbia, to California

Questar Pipeline Co.
Distribution
44 miles; 20-inch
Cost: $ 50,000,000
Various locations in the United States

Southern California Gas Co.
Transmission
1 mile; 16-inch
Cost: $ 1,600,000
Wilmington, Calif.

Repair/rehab
14 miles; 18- to 30-inch
Cost: $ 17,300,000
Various locations in Southern California
Add 10,000 HP
Cost: $ 23,600,000

Tenneco Gas Pipeline Co.
Transmission
82 miles; 10- to 36-inch
Cost: $ 139,000,000
New York, Massachusetts, Rhode Island, and Pennsylvania
Repair/rehab
319 miles; 8- to 30-inch
Cost: $ 11,000,000
22,200 HP
Cost: $ 21,000,000
New York, Massachusetts, Connecticut, and Louisiana

TransColorado Gas Transmission Co.
Transmission
310 miles; 20-inch
Cost: $ 210,000,000
Northern Colorado fields to New Mexico

Transco Inc.
Transmission
14 miles; 16- to 42-inch
12,600 HP
Middlesex, Burlington, and Camden Counties, N.J.; Lycoming County, Pa.
Repair/rehab
1 mile; 20- to 36-inch
Pennsylvania, Georgia, and Alabama

Transwestern Pipe Line Co.
Transmission
97 miles; 30-inch
12,400 HP
Cost: $ 95,000,000
San Juan Basin area

Western Gas Supply Co.
Transmission/distribution
33 miles; various inches
2,100 HP
Cost: $ 6,625,000
Breckenridge, Durango, and Rifle, Colo.

Yukon Pacific Corp.
Distribution
800 miles; 42-inch
Cost: $ 900,000,000
Prudhoe Bay to Valdez, Alaska

CANADA NATURAL GAS

Inland Natural Gas Co. Ltd.
Canada
23 miles; 8- to 42-inch
5,200 HP
Cost: $ 51,500,000
Cranbrook and Vancouver, British Columbia
Repair/rehab
50 miles; 10-inch
Cost: $ 1,000,000
Various locations in British Columbia

TransCanada PipeLines
Canada
646 miles; 12- to 48-inch
15,630 HP
Cost: $1,492,000,000
Alberta, Manitoba, Ontario, and Quebec

Westcoast Energy Inc.
Canada
98 miles; 6- to 36-inch
Cost: $ 5,700,000
Ft. Nelson and Ft. St. John, British Columbia

FOREIGN NATURAL GAS

Sagasco Holdings Ltd.
Australia
Transmission
81 miles; 20-inch
Cost: $ 50,000,000
Bass Straits Field to Tasmania

Bolivian Government
Bolivia
1,020 miles; 24-inch
Cost: $1,700,000,000
Bolivia to Brazil

Sulgas Brasil
Brazil
720 miles; various inches
Cost: $1,700,000,000
Sao Borja to Porto Alegre, Brazil

National Iranian Gas Co.
Iran
1800 miles; Various inches
100,000 HP
Cost: $ 250,000,000
Various locations in Iran

Bord Gais Ireann
Ireland
114 miles; 24-inch
Ireland to Scotland

Europipe Statoil
Norway
469 miles; 36- and 40-inch
North Sea to Germany

Statoil Conoco
Norway
152 miles; 20-inch
Cost: $ 60,000,000
Heidrun to Trondheim, Norway

Petronet
South Africa
65 miles; 8- to 12-inch
7,000 HP
Cost: $ 450,000,000
Alberton to Rustenburg via Tarlton, Transvaal

Statoil Neste Stoseb
Sweden
576 miles; Various inches
Cost: $ 600,000,000
Tronheim to Stockholm
Various locations in Norway

Chinese Petroleum Corp.
Taiwan
66 miles; 10- to 24-inch
Ta-Lin, Chen-Zen, and Hsaio-Kang Airport

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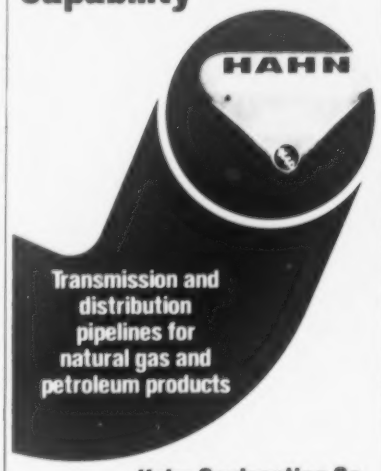

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Petroleum Authority of Thailand
Thailand
Distribution
209 miles: 24- and 30-inch
Cost: $ 150,000,000
Offshore Erawan to terminal at Surat Thanai

Esso Petroleum Co. Ltd.
United Kingdom
29 miles: 12-inch
1,500 HP
Astwood or Redditch to Bromford, Birmingham
Repair
70 miles: 10- and 12-inch
Southern England

Vietgas
Vietnam
80 miles: 20-inch
Cost: $ 240,000,000
Bach Ho field

DOMESTIC GAS DISTRIBUTION

Adobe Gas Pipeline Co.
Gathering
17 miles: 3-, 4-, and 6-inch
Cost: $ 210,000
West Texas and Montana

Battle Creek Gas Co.
Distribution
5 miles: 2- and 4-inch
Cost: $ 231,000
Battle Creek, Mich.
Replacement
8 miles: 2-, 4-, 6-, 8-inch
Cost: $ 677,000
Battle Creek, Mich.

Citizens Gas Fuel Co.
Gathering
5 miles: 2- to 4-inch
Cost: $ 143,000
Various locations in Michigan
Repair rehab
2 miles: 3- and 4-inch
Cost: $ 53,000
Various locations in Michigan

City of Florence Gas Dept.
Repair rehab
1 mile: 6-inch
Downtown Florence, Ala.
Transmission distribution
8 miles: 4- and 6-inch
State Hwy 17 to Zip City, Ala., and vicinity

City of Mesa, Ariz.
Gathering
3 miles: 2- and 4-inch
Cost: $ 700,000
Various locations in the city
Rehab
1 mile: 2- and 4-inch
Cost: $ 200,000
Queen Creek area of Mesa

City of Springfield Utilities
Distribution
7 miles: 4- and 8-inch
Cost: $ 700,000
Willard, Mo.
Repair rehab
10 miles: 2- to 4-inch
Cost: $ 1,500,000
Southeastern portion of Springfield, Mo.

Colorado Interstate Gas Co.
Distribution
223 miles: 24-inch
Cost: $ 200,000,000
Eastern Utah to southern Wyoming

Colorado Springs Department Public Util. Gas
Gathering
12 miles: Small-inch
Cost: $ 997,350
Colorado Springs, Colo.
Repair rehab
26 miles: Small-inch
Cost: $ 2,388,400
Colorado Springs, Colo.

Commonwealth Gas Co.
Distribution
2 miles: 2- and 4-inch
Cost: $ 4,021,000
Worcester and Uxbridge, Mass.
Repair rehab
4 miles: 2-, 4-, and 8-inch
Cost: $ 10,655,000
New Bedford, Holliston, and Dartmouth, Mass.

Connecticut Natural Gas
Distribution
19 miles: 2- to 16-inch
Cost: $ 3,975,000
Hartford and Greenwich, Conn.
Repair rehab
32 miles: 2- to 16-inch
Cost: $ 655,000
Hartford and Greenwich, Conn.

Exxon Gas Systems Inc.
Recoating
30 miles: 36-inch
Cost: $ 6,000,000

Frederick Gas Co.
Transmission distribution
21 miles: 2- to 8-inches
Cost: $ 2,056,550
Frederick city and county areas, Maryland
Repair rehab
3 miles: 2-, 4-, and 6-inch
Cost: $ 403,300
Frederick, Md.

Gulf States Utilities Co.
Gathering
8 miles: Various inches
Cost: $ 280,000
East Baton Rouge Parish, La.
Repair rehab
9 miles: 2- to 6-inch
Cost: $ 1,217,000
East Baton Rouge Parish, La.

Middle Tennessee Utility District
Distribution
110 miles: 2-, 4-, and 6-inch
Cost: $ 3,000,000
Various locations in Texas

Mobile Gas Service Corp.
Gathering
11 miles: Small-inch
Cost: $ 4,229,200
Mobile County, Ala.
Replacement
19 miles: 1.25- to 12-inch
Cost: $ 600,000
Mobile County, Ala.

Montana-Dakota Utilities Co.
Replacement
28 miles: Various inches
Cost: $ 1,780,157
North Dakota, South Dakota, Montana, and Wyoming
Transmission distribution
89 miles: Various inches
1,100 HP
Cost: $ 8,171,307
Valley City, N.D., to Mapleton, N.D.
North Dakota, South Dakota, Montana, and Wyoming

New Jersey Natural Gas Co.
Distribution
105 miles: 2- to 30-inch
Cost: $ 38,038,506
Various locations in New Jersey
Repair rehab
54 miles: 2- to 6-inch
Cost: $ 4,004,847
Various locations in New Jersey

New York State Electric and Gas
Transmission distribution
128 miles: Various inches
Cost: $ 8,986,000
Various districts in NYSEG's system

Distribution
8 miles: Various inches
Cost: $ 4,325,000

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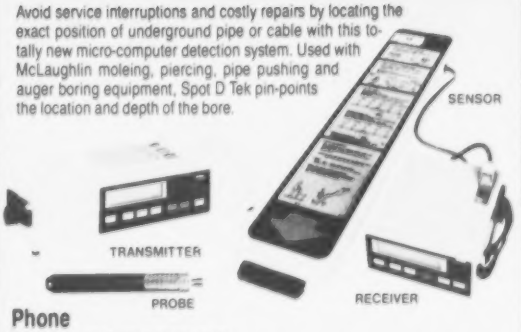

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Circle No. 136 on Card

Various districts in NYSEG's system

Peoples Gas System Inc.
Repair rehab
15 miles: 2- to 6-inch
Cost: $ 4,200,000
Various locations in Florida
Transmission distribution
27 miles: 2-, 4-, and 8-inch
Cost: $ 10,000,000
Various locations in Florida

Rochester Gas and Electric Corp.
Distribution
50 miles: 2-inch
Cost: $ 2,200,000
Rochester, N.Y.
Repair rehab
10 miles: 4- to 8-inch
Cost: $ 2,600,000
Rochester, N.Y.

Seagull Energy Corp.
Gathering
32 miles: 10- and 12-inch
Gulf of Mexico Brazos area

St. Joseph Power and Light Co.
Distribution
1 mile: 2-inch
Cost: $ 13,000
St. Joseph, Mo.
Replacement
3 miles: 5- to 2-inch
Cost: $ 290,000
Maryville, Mo.

TEPPCO
Distribution
13 miles: 6-inch
Greater Cincinnati Northern Kentucky International Airport

Virginia Natural Gas Co.
Repair rehab
1 mile: Various inches
Cost: $ 1,500,000
Various locations in Virginia

Williams Natural Gas Co.
Transmission
65 miles: 8- to 20-inch
Cost: $ 20,000,000
Various locations in Kansas

Willmut Gas and Oil Co.
Distribution
1 mile: 2-, 4-, and 6-inch
Cost: $ 23,459
Hattiesburg, Miss.

Wisconsin Natural Gas Co.
Distribution
25 miles: 10- to 20-inch
Cost: $ 15,500,000
Menasha, Waukesha, Mukwonago, and Watertown, Wisconsin
Repair rehab
5 miles: 6- and 8-inch
Cost: $ 3,600,000
Kenosha, Wisconsin

Yankee Gas Services Co.
Gathering
9 miles: 2- to 6-inch
Cost: $ 1,400,000
Various locations in Connecticut
Replacement
13 miles: Various inches
Cost: $ 4,705,000
Various locations in Connecticut

CANADA GAS DISTRIBUTION

Centra Gas Alberta Inc.
Canada
260 miles: 50- to 4-inches
Cost: $ 6,300,000
Various locations in Alberta

FOREIGN GAS DISTRIBUTION

Gas & Fuel Corp. of Victoria
Australia
Distribution
145 miles: Various inches
Cost: $ 15,000,000
Various locations in Victoria

South Australia Gas Co.
Australia
Repair rehab
25 miles: 6-inch
Cost: $ 2,500,000
Adelaide, South Australia

Ver. Energiebedrijven Scheldeland (EBES)
Belgium
Distribution
132 miles: Various inches
Cost: $ 11,000,000

Ver. Energiebedrijven Scheldeland (EBES)
Belgium
Repair rehab
31 miles: 2- to 8-inch
Cost: $ 3,600,000

Pertamina
Indonesia
Distribution
270 miles: various inches
Cost: $ 120,000,000
Offshore Kangea to Bali, Surabaya and Gresnik

Korea Gas Co.
Korea
Distribution
857 miles: Various inches
Cost: $ 200,000,000
Various locations in Korea

Singapore Petroleum Co. Pte. Ltd.
Singapore
Repair
1 mile: 12-inch
Cost: $ 180,000
Supports and lines between marketing terminal and tanker berth

Petrol Zemeljski Plin D.O.O.
Yugoslavia
Distribution
9 miles: small-inch
Cost: $ 1,797,000
Novo mesto, Golnik, and Sevnica, Yugoslavia

DOMESTIC WATER

City of Virginia Beach, Va.
Transmission
85 miles: 60-inch
Cost: $ 219,000,000
Lake Gaston to Virginia Beach, Va.

FOREIGN WATER

Water Planning for Israel
Israel
Transmission
126 miles: 6- to 54-inch
42,700 HP
Cost: $ 70,000,000
Ilan, Shoevah, Lahish, and Daniel, Israel

Petroleos de Portugal
Portugal
Transmission
5 miles: 6- and 10-inch inches
Cost: $ 330,000
Oporto Refinery Oporto Airport area - Forto Brandao, Lisbon

PENDING PROJECTS BEYOND 1992

DOMESTIC CRUDE

Pacific Pipeline Systems Inc.
Transmission
120 miles: 20-inch
Cost: $ 50,000,000
Gaviota to Wilmington, Calif.

CANADA CRUDE

Alberta Energy Co. Ltd.
Canada
Distribution
6 miles: 12-inch
Cost: $ 3,000,000
Husky Terminal, Alberta

FOREIGN CRUDE

Broome Oil Pipeline Systems
Australia
300 miles: medium diameter
Cost: $85,000,000
Canning basin area of Western Australia

National Iranian Oil Co.
Iran
600 miles: large diameter
Cost: $500,000,000
Gach Saran field, near Persian Gulf to Port of Jask, Gulf of Oman

Shell Pipeline Petroleum Dev.
Nigeria
43 miles: 20-24 inches
Cost: $50,000,000
Opukushi to Forcados terminal

Tazama Pipeline Ltd.
Tanzania
670 miles: 8-24 inches
Cost: $201,000,000
Tanzania to Zambia

Botas
Turkey
2,976 miles: large diameter
Cost: $2,500,000,000
Agajari to Iskenderun Gulf (between Iran and Turkey)

DOMESTIC PRODUCTS

Chevron Pipe Line Co.
Gathering
9 miles: 8-inch
Fina to Warren, Calif.

Colonial Pipeline Co.
Transmission
45 miles: 12-inch
Cost: $ 40,000,000
Badinbridge, Ga., to Jefferson County, Fla.

CANADA PRODUCTS

Interprovincial Pipe Line Inc.
Canada
Transmission
145 miles: unknown inches
Cost: $ 145,000,000
Quebec City to Montreal

FOREIGN PRODUCTS

Sonatrach
Algeria
500 miles: medium diameter
Cost: $125,000,000
Southeast Algerian fields to Hassi Messaoud

Oil India Ltd.
India
826 miles: medium diameter
Cost: $200,000,000
Khandia to Bhatinda

Laos government
Laos

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KUKLA TRENCHERS

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260 miles, medium diameter
Cost: $65,000,000
Vinh, Vietnam to Vientiane, Laos

Statoil
Norway
140 miles, 20 inches
Cost: $420,000,000
Condensate line from Sleipner field to Karsto

British Petroleum
United Kingdom
150 miles, 24 inches
Cost: $100,000,000
Bruce field to Forties field, UK North Sea

DOMESTIC TRANSMISSION

Panhandle Eastern Corp.
Transmission replacement
126 miles, 8- through 36-inch
59,150 HP
Cost: $ 210,000,000
Various locations in Ohio, Pennsylvania, West Virginia and New Jersey

Tenneco Gas Pipeline Co.
Transmission
1,000 HP
Station 264 in Charlton, Mass.

FOREIGN TRANSMISSION

Abu Dhabi National Oil Co.
Abu Dhabi
93 miles, 28 inches
Cost: $50,000,000
Maqta to Al Ain

Algeria, Spain, Morocco
1,265 miles, 20-24 inches
Cost: $1,300,000,000
Algeria to Morocco under Mediterranean Straits, starting at Hassi R'Mel field in Algeria, ending at Seville, Spain; 300 miles. Hassi R'Mel field to Morocco, 900 miles through Morocco across Straits of Gibraltar to Seville

Sonatrach
Algeria
300 miles, 24 inches
Cost: $200,000,000
Hassi R'Mel field to Moroccan border

Argentine government
Argentina
600 miles, 10-24 inches
Cost: $300,000,000
Campo Duran to Chaco, Argentina

Gas del Estado
Argentina
350 miles, 18 inches
Santa Fe, Argentina, to Montevideo, Uruguay
775 miles, 30 inches
Salta Province, Argentina, to Rio Grande do Sul state, Brazil
Cost: $300,000,000

Auckland Gas Co.
Australia
40 miles, 1.6 inches
Cost: $5,000,000
Auckland area

Department of Resources & Energy
Australia
3,000 miles, large diameter
Cost: $3,000,000,000
Transcontinental Australia pipeline

Doral Resources
Australia
50 miles, medium diameter
Cost: $35,000,000
Onslow to Dampi-Burbury line

Gas & Fuel Corp. of Victoria
Australia
16 mile gas line and distribution lines in Singapore

Mt. Isa Mines Ltd.
Australia
500 miles, medium diameter
Cost: $75,000,000
Cooper Basin fields to Mt. Isa

Petronet
South Africa
17,000 HP
17 new pump stations in South Africa

Gas & Fuel Corp. of Victoria
Australia
80 miles, various sizes
Cost: $20,000,000
Katrook to Portland, Victoria
209 miles, various sizes
Cost: $16,000,000
Melbourne, Victoria

Magellan Petroleum Corp.
Australia
375 miles
Cost: $150,000,000
Amadeus Darwin site to Gove

Pipeline Authority of S. Australia
Australia
82 miles, 12 inches
Cost: $40,000,000
Wagga Wagga to Albury, New South Wales

Petrobangla
Bangladesh
159 miles, 6, 16, and 20 inches
Cost: $48,800,000
Kailashtila field to grid in Ashuganj

Distrigaz
Belgium
65 miles, 16 inches
Cost: $5,000,000
Zeebrugge to Blaregnies

Energiebedrijven Schiedeland
Belgium
57 miles, 14-40 inches
Cost: $40,000,000
Replacement Antwerp area

YPFB
Bolivia
332 miles, 24 inches
Cost: $250,000,000
Santa Cruz to Brazilian border

Petrobras
Brazil
1,175 miles, large diameter
Cost: $400,000,000
1,050 miles from Urucu region to Carajas; 125 mile spur to Manaus
Extensions to Belem and Sao Luis could add 700 miles

Y.P.F.B. Petrobras
Brazil
1,010 miles, 24 inches
Cost: $400,000,000
Brazil-Bolivia border to Sao Paulo, Brazil

TransAsean Consortium
Brunei, Indonesia, Malaysia, Philippines, Thailand
5,000 miles, large diameter
Cost: $3,000,000,000
Fields offshore Thailand through Malaysia, Indonesia, and Brunei to the Philippines

China National Offshore Oil Corp.
China
60 miles, 30 inches
Cost: $10,000,000

Yacheng field, South China Sea, to Hainan Island, China
680 miles, 24 inches
Cost: $300,000,000
Hainan Island to Guangzhou

Carbocol
Colombia
310 miles, 24 inches
Cost $800,000,000
San Cristobal, Venezuela to Bogota, Colombia

Ecopetrol
Colombia
58 miles, 20 inches
Cost: $30,000,000
Dibulla to Barranquilla

Promigas
Colombia
621 miles, 20-24 inches
173 miles, 20 inches
248 miles, 24 inches
Cost: $250,000,000
Dibulla to Barranquilla

Dansk Olie Og Naturgas
Denmark
67 miles, 10, 12, and 30 inch

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lines
Cost: $5,000,000

Dubai Natural Gas Co.
Dubai
200 miles, large diameter
Cost: $150,000,000
Qatar's North field to Jebel Ali-Dubai

Bapetco
Egypt
74 miles, 16 inches
55 miles, 16 inch loop from BED-2 to Amriyah
19 miles, BED-2 to BED-3
Cost: $60,000,000

Khalda Petroleum Co.
Egypt
59 miles, 10 inches
Cost: $15,000,000
Salam to Mersa Matruh

Ministry of Trade and Industry
Finland
250 miles, 20 inches
Cost: $80,000,000
Rutmilax across Gulf of Bothnia to Gaevle, Sweden

Gaz de France
France
44 miles, 24 inches
Cost: $30,000,000
Salam to Lacq

BEB
Germany
100 miles, medium diameter
Cost: $50,000,000
Achim to Salzwedel

EVG
Germany
100 miles, 32, 10 inches
Cost: $80,000,000
Vitzenda to Gera

Erdgasversogungsgesellschaft
Germany
200 miles
Cost: $450,000,000
Vitzenda to Niedermunder/Saxony

Kombinat Gasanlagen
Germany
155 miles, medium diameter
Cost: $75,000,000
Philippsthal to Sayda

Midas GmbH
Germany
Joint venture Wintershall/OMV
348 miles, 32 inches
Cost: $200,000,000
Rysum to Ludwigshafen

Ruhrgas AG
Germany
163 miles, 48 inches
Werne to Bochholt
49 miles, 40 inches
Lauterbach to Vitzenda
16.3 miles, 24 inches
Emmond to Anten
Cost: $750,000,000

Wintershall AG
Germany
355 miles, large diameter
Cost: $300,000,000
Rysum to Ludwigshafen

Hungarian Oil & Gas Trust
Hungary
22 miles, 31 inches
Cost: $20,000,000
Pinsk to Dongi

State Oil and Gas Trust
Hungary
200 miles, 28-32 inches
Cost: $125,000,000
Berevdarac to Szeged
300 miles, large diameter
Gnd inking Hungary, Austria, Czechoslovakia and Yugoslavia

Gas Authority of India Ltd.
India
900 miles, large diameter
Bombay to Bangalore
1,500 miles, large diameter
National gas grid
Cost: $3,000,000,000

Gujarat Gas Co. Ltd.
India
230 miles, medium diameter
Cost: $140,000,000
Gas network in Gujarat state

Oil and Gas Commission
India
175 miles, medium diameter
Cost: $150,000,000
East and West Godavari districts of Andhra Pradesh
95 miles, medium diameter
Cost: $75,000,000
Southern loop, Western Offshore Integrated Development Project

Pertamina
Indonesia
839 miles, 24 and 30 inches
545 miles, 24 inches, Block B fields, South China Sea, to Malak, Balam and Duri oil field in Sumatra
Phase 2, 294 miles, 30 inches, Natuna field to Natuna Island and Matak
Cost: $2,000,000,000

National Iranian Oil & Gas Co.
Iran
1,900-mile line from Iran to Pakistan, India, and possibly China
Cost: $11,000,000,000
World Bank to aid financing

Agip
Italy
84 miles
Cost: $20,000,000
Libya - Bu Attifel field to gas treatment plant

Korea Gas Corp.
Korea
825 miles, large diameter
Cost: $2,200,000,000
Network connecting 20 major cities

Agip
Libya
350 miles, large diameter
Cost: $3,500,000,000
Bourn field offshore Libya to Italy

Libyan government
Libya
448 miles, 30 inches
400 miles, al Brika to Khoma
48 miles, 30 inches, sirte basin
Cost: $2,000,000,000

Petronas
Malaysia
109 miles, 30 inches

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Cost: $100,000,000
Labo to Singapore. Peerong to Kaoh Sudang
187 miles; 6, 8, 36, and 24 inches
Cost: $365,000,000
Several fields offshore Sarawak

Trans Mexico
Mexico
1,318 miles; 36 inches
Cost: $1,000,000,000
Line following Mexico-U.S. border; spears to U.S. border

Ministry of Energy
New Zealand
145 miles; 14-20 inches
Cost: $70,000,000
Huntly to Marsden power stations

Midgard Field Partners
Norway
300 miles; large diameter
Cost: $400,000,000
Midgard field to existing Norwegian gas grid

Norske Shell
Norway
100 miles; large diameter
Cost: $50,000,000
Troll field to processing plant at Oeygarden or Bergen

Statoil
Norway
524 miles; 36-40 inches; Zeeppe line Sleipner to Zeebrugge, Belgium 80 miles; 36 inches Zeeppe Troll to Hemdsa 95 miles; 40 inches; Zeeppe

Troll to Sleipner
40 miles; 20 inches; Sleipner to Kaarstø
Cost: $7,500,000,000

Petroleum Development Co
Oman
48 miles; medium diameter
Cost: $30,000,000
Lekhwair field to Rahaba's gas grid

Sui Gas Transmission Co
Pakistan
162 miles; 20 inches
Cost: $80,000,000
Sui to Kot adu

Petroleos del Peru
Peru
364 miles; 26 inches
64 miles; 8 inches
Cost: $60,000,000
Camisea Duplo to Cavalo Loma

Portuguese government
Portugal
200 miles
Cost: $800,000,000
Lisbon to Braga near Spanish border gas distribution systems; five year program

Qatar-Pakistan
Qatar-Pakistan
1,000 mile gas line from Qatar to Karachi, Pakistan
Feasibility study completed
Cost: $3,000,000,000

Enagas
Spain
300 miles; 26 inches

Cost: $461,000,000
Sea line to Marina
200 miles; 12-24 inches
Cost: $60,000,000
Reach Navarra area

Stosed
Sweden
150 miles gas grid around Stockholm
Cost: $300,000,000

Al Furat Petroleum
Syria
335 miles; 8-18 inches
275 miles; 16 inches; Omar field to Deirezzur
60 miles; 8-12 inch lines to Thayyem, Tishreen, Alca
Cost: $160,000,000

Trinidad Tobago
Trinidad Tobago
800 miles; large diameter
Cost: $2,500,000,000
Trinidad to Puerto Rico to other Caribbean islands

Botas
Turkey
400 miles; up to 12 inches
Bursa city distribution system
515 miles; large diameter; 315 miles; Bursa to Izmir and 210 miles; Izmir to Karabuk
Cost: $150,000,000

Amoco Exploration Co
United Kingdom
254 miles; 36 inches
Cost: $225,000,000

Central Area Transmission system; Everest and Lomon offshore fields to Teesside

Gas Transmission U.K. Ltd
United Kingdom
180 miles; 30-36 inches
Cost: $150,000,000
Barton to Thames Estuary, east of London

Kinetica Ltd. (Conoco PowerGen)
United Kingdom
175 miles; 36 inches
Cost: $30,000,000
Lincolnshire coast to power stations

Scottish Area Gas Evacuation System (Sage)
United Kingdom
150 miles; 24 inch
Cost: $475,000,000
Miller North Sea Magnus Oil Beryl North Sea field to St. Fergus

Shell U.K. Exploration & Production
United Kingdom
110 miles; 24 inches
Cost: $75,000,000
Easton to Shell Haven refinery on the Thames Estuary

Total Oil Marine
United Kingdom
110 miles; 22 inches
Cost: $75,000,000
Canter field, UK North Sea to Kinloghorne

U.S.S.R. Sweden
400 miles; large diameter
Cost: $350,000,000
Eastern U.S.S.R. through Latvia across the Baltic Sea to southeast Sweden

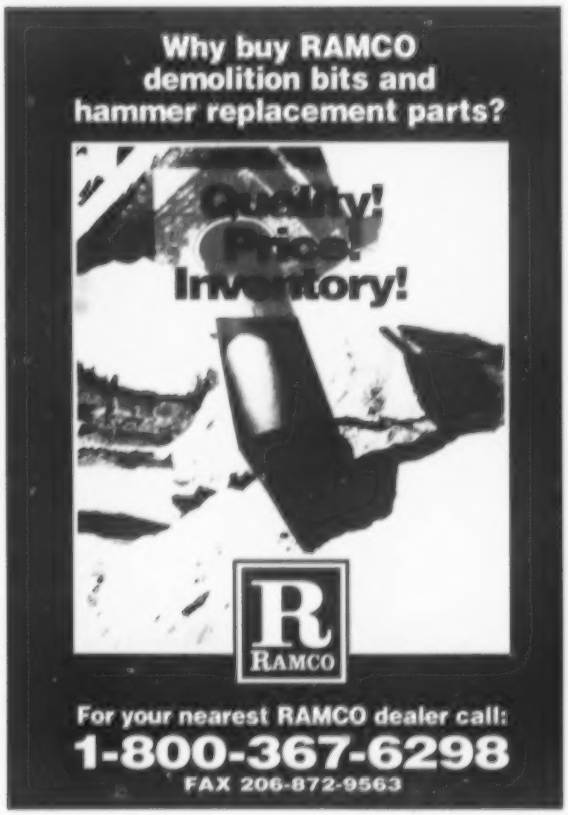
U.S.S.R.
U.S.S.R.
1,075 miles; large diameter
375 miles from Stokmanovskoye field in Barents Sea to Murmansk
650 miles from Murmansk to Leningrad
Cost: $3,000,000,000

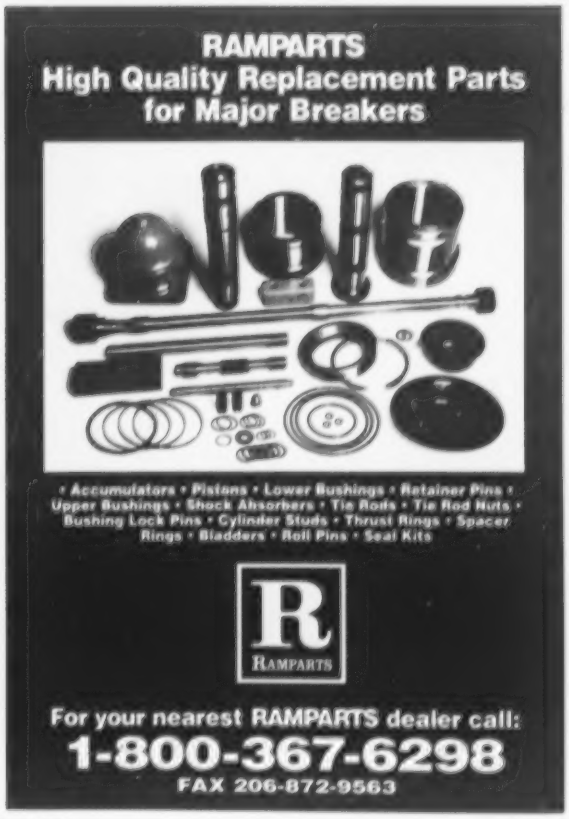
U.S.S.R. Korea
U.S.S.R. Korea
2,700 miles; large diameter
Cost: $3,000,000,000
Vityz in Eastern Siberia to North and South Korea

Petroleos de Venezuela
Venezuela
28 miles; 16 inches
Cost: $5,000,000
Offshore Margarita Basin fields to Mapire Bay

Energoinvest with INA
Yugoslavia
90 mile line connecting eastern and western gas networks
Cost: $5,000,000

Yugoslavian government
Yugoslavia
650 miles; small to medium diameter; 160 miles main line; 415 miles main and distribution lines; 75 miles urban mains
Cost: $100,000,000

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